SOIL conservation

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This month SOIL CONSERVATION is featuring an article by David G. Unger explaining the sediment control institutes to be held in most of the states by the end of 1973. Unger is with the National Association of Conservation Districts.

Charles Phillips, a soil conservationist in the Washington, D.C. office, in his article gives us the SCS position in the pollution picture.

Vincent Price has written a piece about an excellent practice—keeping storm water on the site where it falls. Montgomery County, Maryland, is doing it—and Denver, and Chicago. It's worth reading about.

Look for the SCS annual report in the February issue of SOIL CONSERVATION.

COVER: A residential development in Montgomery County, Maryland, boasts of 13 ponds constructed to enhance the natural setting and to store storm water. The ponds double as sediment-catching basins during construction. See "Storm water, hold it!" beginning on page 123.

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From the Administrator:

More Work, less emotion

Pollution comes in many forms.

So do pollution fighters.

There are the alarmists—and alarm does not provide the best atmosphere for finding rational solutions to worrisome problems. Overdramatization serves to deflect attention from the genuine ecological issues we face and blind us to the solutions that are workable.

There are those who search for an easily identifiable villain to censure. Some in this group regard modern technology as the intruder on the naturally ordered systems that support us.

And there are some who simply yearn for a return to nature at its pastoral, unused, and untouched best.

Then, fortunately, there are people who accept the fact that there is another way out of the environmental crisis: more work and less emotion.

Environmental problems have not been invented by visionary ecologists. They are very real. To overcome them, we must seek out their origins, link these with the economic and social processes that govern how we live in the world, and learn how to change these processes so that they conform to the needs of the environment and of the people.

The extent and the complexity of our environmental problems are becoming better understood. What is being done to solve these problems may be lesser known.

For example, much of what has been happening in recent years to combat the problem of sedimentation has not made the front page or the 6 o'clock news.

Sediment *is* a major pollutant. It is a problem almost anywhere that soil is moved to become the silt, mud, and muck that is so destructive to water quality and so costly to remove.

Some local governments throughout the country have enacted ordinances that require builders and developers to reduce erosion on construction sites. And several states have laws providing for sediment control programs to be carried out with the assistance of soil and water conservation districts.

To examine closely the problem of erosion and sedimentation and to encourage action by all the states, state associations of conservation districts and state soil and water conservation agencies are sponsoring a series of sediment control conferences, with help from the National Association of Conservation Districts, the U.S. Environmental Protection Agency, and others. These conferences and the need for them are very well explained in this issue of SOIL CONSERVATION by Dave Unger, the assistant executive secretary of NACD.

SCS people are well aware that local conservation districts, for more than 30 years, have been deeply involved in establishing and maintaining erosion and sediment control measures on agricultural and forest lands. Today, these same districts, which cover more than 98 percent of the privately owned lands in the nation, are also directing their attention to the soil erosion and sediment deposition resulting from rapid shifts in land uses, especially from agricultural and rural to nonagricultural and urban uses.

Dave Unger says in his article, "Slowly but surely, soil erosion is becoming illegal in this country." But practical methods for preventing erosion and controlling sediment are well known *now*. Let's use them.

Kenneth E. Grant

A new look at sediment control

by David G. Unger
Assistant executive secretary
National Association of Conservation Districts
Washington, D.C.

Last summer, Governor Robert Docking of Kansas called together 150 of the state's leaders in agriculture, conservation, land development, and local, state, and federal government. The occasion was the Governor's Conference on Sediment Control —the first in a series of institutes to be held in most of the states by the end of 1973.

The purpose of these conferences is to examine anew the problem of erosion and sedimentation, explore programs underway in several states to intensify sediment control work, and encourage action by all the states. State associations of conservation districts and state soil and water conservation agencies are sponsoring the institutes, with help from the National Association of Conservation Districts (NACD), the Environmental Protection Agency (EPA), and others.

Among the key topics of discussion at these institutes are recent federal proposals, which if enacted, would require the states to establish mandatory sediment control programs. Another is a model state act for soil erosion and sediment control in both rural and urban areas prepared by the Council of State Governments.

The decision in Kansas was to appoint a task force responsible for recommending legislative and other actions that can be taken to strengthen that state's work in this field. Similar actions are expected to result from institutes that have been held in Oklahoma, Louisiana, Oregon, West Virginia, Montana, and Minnesota and from others that will soon be held in other states.

The idea for the conferences goes back to the National Conference on Sediment Control held in 1969 in Washington, D.C., by NACD, the Soil Conservation Society of America, and the National Association of Counties. It received further impetus from educational meetings on sediment control held in Michigan, South Carolina, and North Carolina. Let's review some of the history behind the concept.

During the past decade, those of us engaged in conservation have witnessed a re-interpretation of some basic concepts. One of

David G. Unger was one of the speakers at the first conference on sediment control, which was held last summer in Salina, Kansas. Lyle Bauer, treasurer of the National Association of Conservation Districts, is seated on the left, and D. D. Holland, an SCS geologist, is on the right.

the results of this re-interpretation is that today we are concerned more directly with "sediment control" rather than "erosion control."

Back in February 1937, when President Franklin Roosevelt wrote to the governors of all the states encouraging them to support legislation to create soil conservation districts, he said:

"The dust storms and floods of the past few years have underscored the importance of programs to control soil erosion. I need not emphasize to you the seriousness of the problem . . . The nation that destroys its soil destroys itself."

Today, when we talk about sediment control, we are describing essentially the same problem, but we are approaching it from a different direction. We are looking at it not so much from the standpoint of how the soil is washed away, but how it affects people on the way downstream and where it comes to rest.

Sediment control is not a new topic to conservation districts. It has been a principal concern of ours for 35 years. What *is* new is that today when we consider sediment control we deal with it in terms of pollution control as well as the preservation of soil as a productive resource.

Sediment has been declared the nation's greatest pollutant of our streams and lakes, by volume. The USDA Agricultural Research Service estimates that 4 billion tons of soil materials are washed into tributary streams in the United States each year. The storage capacity of manmade reservoirs in this country is being reduced at the rate of about 1 million acre-feet each year. The material being dredged annually from waterways of all kinds is estimated at three-quarters of a billion cubic yards.

What are the consequences? First, there is the irreparable loss of soil at the source, soil that has usually taken many thousands of years to form. Second, sediment and the pesticides, plant nutrients, and other materials that are carried with it pollute streams

and impair the processes of water purification and distribution. And third, sediment causes damage where it comes to rest, detracting from recreation, damaging fish and wildlife habitat, and making necessary large public expenditures for its removal.

What has been happening in recent years to deal with the problem? First, there has been action by municipal and county governments. In many places across the country, local governments have enacted ordinances requiring builders and developers to reduce erosion on construction sites in cooperation with conservation districts.

Second, the Federal Highway Administration has issued standards which require use of various erosion prevention techniques in the construction of new federal-aid highways.

And third, several states have enacted laws providing for various kinds of accelerated and intensified sediment control programs, all of them to be carried out with the assistance of soil and water conservation districts and their cooperating agencies. Maryland, South Carolina, Ohio, and Iowa have passed such laws, along with the Virgin Islands. Similar laws have been drafted and are being considered in other states including Virginia, New York, and Washington.

There are three trends exemplified in these legislative approaches. The first is that soil and water conservation districts are given greater authority to deal with the problem. The second is that although the early laws deal primarily with construction-type erosion, the newer laws are concerned with erosion from farm and forest lands as well. And the third trend is toward an increasing degree of mandatory control in comparison to voluntary action.

Slowly but surely, soil erosion is becoming illegal in this country.

Over the years, conservation district leaders have been proud that 2 million land owners and operators have voluntarily agreed to establish conservation measures that benefit themselves and the public as well. At the same time, we've been aware that increasingly the public has asserted its right to compel those who own and manage resources to do so in a manner that minimizes harm to others and to society at large.

Sediment control, it appears, may well be the testing ground on which this issue is first confronted by soil and water conservation districts.

This is exactly what is happening.

In March 1972, the Environmental Protection Agency and the Council of State Governments prepared to develop a model state sediment control law for submission to the state legislatures.

Here is where NACD entered the picture. Our Special Committee on District Outlook had its own plans to develop model legislation in this field. We joined with EPA and the Council of State Governments in an environmental legislation symposium and hammered out a set of principles to guide the development of model legislation. We persuaded EPA that conservation districts and the state soil and water conservation agencies were by law and experience the appropriate agencies to do the job of sediment control.

Next, we helped put together a task force representing the Department of Agriculture, EPA, state governments, and the NACD to draft a model law.

The model law is premised on two basic recommendations:

"1. Responsibility for an erosion and sediment control regulatory program should be placed in the conservation districts which have the responsibility under the laws of all fifty states for the control of erosion and sediment deposition. This responsibility would be in conjunction with, but would not replace, those state and local regulatory programs concerned with the quality of soil and water resources and pollution abatement activities.

"2. Suggested state erosion and sediment control legislation should be drafted in the form of an amendment to existing conservation districts' enabling laws."

In carrying out its mandate, the task force critically reviewed each provision of the model law from the standpoint

of practicality and efficacy in achieving the desired objective of the legislation. Recognizing that any model act must be tailored by each state to comply with its constitutional and statutory requirements, the task force endeavored to set down in as clear and straightforward a manner as possible the essential requirements of an effective soil erosion and sediment control law.

Principal authorities and requirements of the model law include:

1. Establishment of a comprehensive state soil erosion and sediment control program applicable to different types of land use and soil conditions, with identification of areas having critical soil erosion and sediment problems; and adoption of statewide guidelines including conservation standards for the control of erosion and sediment resulting from land disturbing activities.

2. Establishment of district soil erosion and sediment control programs and conservation standards consistent with the state program and guidelines.

3. Prohibition of certain land disturbing activities unless conducted in accordance with approved soil erosion and sediment control plans with special requirements applicable to land disturbing activities resulting from normal agricultural and forestry activities.

4. Use of existing regulatory mechanisms, such as building, grading, and other permits applicable to land disturbing activities to implement erosion and sediment control plan requirements.

5. Inspection, monitoring, and reporting requirements. Provision for modification of approved plans by mutual agreement.

6. Penalties, injunctions, and other enforcement provisions.

7. Provisions for cost-sharing.

8. Appropriations to carry out the act.

Dale Cochran, minority leader of the Iowa Legislature and a strong supporter of the conservation district program, presented the model law to the Council of State Governments. It was accepted unanimously and has been distributed to the state legislatures—along with other environmental legislation.

The next step is up to the conservation districts of this country. They need to decide how important sediment control is in their districts, what needs to be done about it, and whether this law—or a variation of it—is a good approach. The time is ripe for districts and state soil and water conservation agencies to exercise their authorities and responsibilities in this field.

To help explore this question in every state, NACD has secured a contract from the Environmental Protection Agency to help sponsor the sediment control institutes. These are bringing together district officials, county and municipal officers, state legislators, farm organizations, builders and developers, and representatives of state and federal agencies and organizations to discuss the problem of sediment control, the action that has been taken in other states, and the model legislation.

All indications are that the public will demand that sediment, like other pollutants, be controlled. Regulatory programs in this field are inevitable, and this is borne out by the actions being taken in states that have legislated in this area. The questions that remain are who will carry out these programs, and how.

This complex and significant issue of sediment control is sure to dominate discussion in the soil and water conservation movement for some time to come. Its resolution should constitute one of the major developments in the history of conservation districts. ♦

Environmental concerns in conservation planning

by Charles G. Phillips
Soil conservationist
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For almost four decades, the Soil Conservation Service, working with conservation districts and others, has provided technical help in planning and implementing systems for controlling agricultural related pollutants and sediment from nonagricultural sources.

Soil erosion and sediment

Sediment, measured in terms of total volume, is the country's largest pollutant.

It has been estimated that the Mississippi River, with an annual flow of 450 million acre-feet of water, carries nearly 400 million tons of sediment into the Gulf of Mexico every year.

Agricultural lands are large contributors of sediment, and those that are unprotected by plant cover generally are the worst offenders. Cropland is the greatest contributor. Other major sources of sediment are land made bare by forest fires, overgrazed pasture and range land, exposed streambanks and roadbanks, highway construction areas, and construction sites in general.

Applying practices that help to control erosion is the most effi-

Environmental degradation resulting from severe sheet and gully erosion on unprotected cropland.

cient way to reduce sediment. On agricultural land, minimum tillage, mulching, crop rotation, terracing, contouring, and stripcropping are highly effective conservation practices. Also, changing the land use on sloping land from cropland to pasture or woodland will reduce erosion.

On construction sites, sediment can be reduced by mulching, seeding, and sodding bare slopes, by minimizing soil disturbance, and by saving as many trees as is practical. Using debris basins until construction is completed and the area is stabilized and covering all critical areas, streambanks, and roadbanks with vegetation also help prevent soil loss. The vegetation should be equal to or better than the natural cover before disturbance.

Plant nutrients as pollutants

About 5 million tons of undissolved plant nutrients adsorbed by sediment particles are carried down the Mississippi River each year along with the 400 million tons of sediment. Obviously, erosion control and other soil management practices are needed to reduce this loss to the minimum.

Farmers and ranchers apply about 15 million tons of plant nutrients on their land every year. These fertilizers contain 6 million tons of nitrogen, more than 4 million tons of phosphate, and about 4 million tons of potash. Minimum amounts of these nutrients are lost where effective soil management practices are used.

Animal wastes as pollutants

Wastes from feedlots, barnyards, and other disposal areas are often picked up by surface runoff and carried into streams and lakes. These wastes can deplete the oxygen supply in the streams and lakes and destroy fish and other aquatic life.

The waste from livestock in the United States equals that of the human population—about 2 billion tons annually. A feedlot holding 50,000 head of beef cattle can produce waste equivalent to a city of 600,000 persons. Even though all livestock waste is not a pollution hazard, runoff from feedlots must be controlled to avoid polluting streams, ponds, and lakes.

Air pollution

Air pollution has long been recognized as a problem in the urban environment. Carbon monoxide, the most common air pollutant in cities, is toxic to man and animals. In some sections of the country, air pollution is becoming a threat to agriculture. Exhaust fumes and smoke from burning coal and oil are toxic to many plants.

Dust and offensive odors are problems in both rural and urban areas. Tree windbreaks and ground cover can reduce soil blowing and dust, and the effective disposal of livestock wastes can do much to eliminate odor problems.

Noise can be considered a form of air pollution. Trees, shrubs, and grass absorb and filter some of the noise from power mowers, motorcycles, trucks, buses, farm machinery, off-road recreation vehicles, airplanes, and construction machinery.

Plants are not only the primary source of oxygen, but also they are natural air-conditioners. They absorb and filter large amounts of dust, smoke, odors, soot, pollen, and fumes. By shading the ground, they also tend to cool the air.

Planning for control of pollutants

SCS assistance in planning and implementing systems for controlling agricultural related pollutants and sediment from nonagricultural sources is provided in accordance with acceptable technical standards and meets all local and state regulatory requirements. The advice and counsel of concerned local and state agencies are solicited during the planning process.

Measures to control or reduce pollutants include controls for runoff from barnyards, feedlots, enclosed feeding barns, milking parlors, manure storage areas, and silo drainage areas; and control of erosion in heavy-use areas, on construction sites, and in other critical areas.

SCS has issued national standards for pollutant reducing practices, such as critical area planting, debris basins, disposal lagoons, diversions, heavy-use area protection, holding ponds and tanks, irrigation water management, toxic salt reduction, and

waterways. An interim standard and specification guide has been issued for "on-farm sanitary landfill." Most of the dozens of conservation practices used over the years have had a remarkable effect on controlling pollutants.

In planning systems for controlling pollutants, the agronomist, biologist, engineer, forester, geologist, hydrologist, landscape architect, plant materials specialist, soil scientist, and range conservationist are all involved in providing the basic information needed by the soil conservationist to recommend alternative solutions to the decision maker in solving his pollution problems. Often expertise outside SCS is sought.

Planning guidelines

SCS observes the following guidelines in planning for the control of pollutants:

—Suitability of soils and topography is given high priority in locating facilities for the control of agricultural related pollutants.

—Appropriate alternative systems are considered during development of the conservation plan.

—The planned systems and components meet requirements for effective operation and maintenance and are in conformance with all applicable regulations and ordinances.

—Conservation plans provide for present and future control of pollutants.

—Surface runoff and subsurface drainage containing agricultural wastes are intercepted whenever feasible.

—The disposal site is carefully selected and located. All pertinent location information is documented in the plan.

—The conservation plan indicates the sequence of practice establishment when appropriate sequence is important.

—The land user is informed of private professional assistance available as needed.

—The land user is informed that he is responsible for obtaining all necessary permits and meeting all regulatory requirements.

Public awareness of environmental degradation provides the Soil Conservation Service and governing bodies of conservation districts with an unparalleled opportunity to give land users the technical help needed in planning and implementing pollutant controls. The seventies may be remembered not only as the time when the public became aroused about the environment, but also as the decade when SCS and conservation districts were able to achieve greater success than ever before in controlling agricultural related pollutants and nonagricultural sediment. ♦

Environmental improvement resulting from a grassed waterway and a grade-stabilization structure installed as part of a planned water-disposal and erosion-control system.

Storm water, hold it!

by Vincent J. Price
Information Division, SCS
Washington, D.C.

In Denver, Colorado, areas being redeveloped are served by a combined sanitary and storm water runoff sewer system. To prevent increased storm flows—caused by heavy urbanization—from overtaxing the municipal waste disposal system and creating sanitary and drainage problems, the Denver Urban Renewal Authority requires that "all redevelopers temporarily detain storm water onsite."

On Chicago's flat topography, drainage channels may not be able to handle storm runoff from urbanizing areas. According to the Greater Chicago Metropolitan Sanitary District, "The problem of storm-water runoff is increasing at a fast rate, and it is estimated that . . . it would cost $192 million to rectify the deficiencies created by continual development." Accordingly, the sanitary district now requires "storm-water detention facilities as a pre-condition to the issuance of sewer permits in unsewered and separate sewered areas."

In Montgomery County, Maryland, rapid urbanization has increased storm-water runoff, causing severe erosion and sediment problems. A combined county-state-soil conservation district program of storm-water management has been instituted.

For most communities, onsite storm-water management is a new concept in urban conservation. Denver started in 1970. The Chicago program became effective in January 1972, and the Montgomery Soil Conservation District began its mandatory program on July 1, 1971. Each program is unique, but all are a reply to the problems of storm-water management in an urbanizing area.

Montgomery County borders the District of Columbia and shares in metropolitan Washington's dynamic growth. The county's population has risen to 530,000, and massive development continues.

Dozens of commercial developments—shopping centers, office and apartment buildings—cover many acres of former farmland. Where grass, trees, shrubs, and forest litter have been replaced by macadam, concrete, and other nonpermeable materials, the amount of storm runoff has shot up. Lew Williams, SCS district conservationist, in referring to a major shopping center, said, "When this area was woods, less than an inch of water would run off after a storm of 3 inches; now nearly 3 inches runs off."

In one of the county's largest shopping centers, for example, runoff water goes into a concrete outfall, then down an open channel to a half-mile of concrete conduit. The conduit then high-speeds the storm water to the point of discharge—Sligo Creek.

Peak flows at the Sligo Creek discharge point, increased by urbanization and the concrete conduit, are an estimated 6 to 8 times higher than former peak flows. Over the years, these heavy, high-speed streams of water shooting out of the concrete outfall have damaged the creek—undercutting the banks with extensive gullies, collapsing trees, widening and scouring the streambed, and sending tons of sediment down the creek toward the Anacostia River and the Potomac River.

Because of rapid development throughout Montgomery County, what has happened to Sligo Creek is also happening to many other streams. The reason is not hard to find: while farmers and foresters try to conserve water for their crops and trees, urban landowners wish only to be rid of it.

"Rainfall on urban land is not a resource but a liability," explained Williams, "and the developer tries to get rid of this liability as quickly as possible, generally to the detriment of the downslope and downstream property owners."

On April 22, 1970, the Maryland Sediment Control Law was signed, requiring that "land clearing, soil movement, and construction shall be carried out in accordance with the written recommendations of . . . soil conservation districts regarding the control of erosion and siltation and the elimination of pollution." Before building or grading permits are issued, a developer must satisfy the responsible soil conservation district that plans have been proposed to prevent undue erosion.

The Sediment Control Law was designed primarily to prevent onsite erosion and the resultant sedimentation. But, the Montgomery Soil Conservation District asked, "What about offsite erosion caused by runoff from a development? Does the 1970 law allow Maryland districts to require onsite storm-water management?"

In April of last year, the Maryland Attorney General delivered an opinion on the question, ruling that "protective storm-water measures may be imposed by the soil conservation districts."

A subcommittee of the Sediment Control Task Force, consisting of two SCS engineers, four consulting engineers, and a developer, worked through May of 1971 to come up with design criteria for storm-water management. When the criteria were agreed upon, the Montgomery Conservation District adopted onsite storm-water management as a pre-condition for plan approval of new developments. The program began in the Montgomery District on July 1, 1971.

In storm-water management, the problems are more easily identified than solved. At present there are four major types of solutions: roof storage, storage on flat areas such as parking lots and playgrounds, underground storage, and ponds. Each method shares the principle of storing the rainfall temporarily and releasing it at the rate that was normal before construction.

Storing water on flat roofs is easier than it sounds. Commercial roof ponding systems are available. One system consists of a ring built around a standard roof drain installation. A slight steady flow of water is released through the ring. A heavy rain flows over the top of the ring, preventing damage to the building.

Most roofs are already designed to support a load equal to 6 inches of water, so no structural modifications are necessary. One complaint that developers voice about roof ponding, according to Williams, is that "whenever you design for purposely storing water on a roof, roofers seem less willing to guarantee their work."

Parking lot storage is more problematic because parking lots are used space and roofs generally are vacant space. But new methods do offer promise. In Germany, for example, a perforated paving block is used to cover parking lots. This allows much of the rainfall to be absorbed into the ground.

Underground storage can be of two types: tanks or leaching pits. A leaching pit takes advantage of the permeability of soil, but there can be maintenance problems. Since there is no outlet other than infiltration, any extraneous material that gets in will tend to fill or clog the pit.

Underground storage tanks can be of any size or shape. Generally the tank has a large pipe inlet and a small outlet, with an emergency overflow piping system for extremely heavy rains. One Montgomery County developer has modified a 300-foot-long pipe to store rainwater.

Ponds for onsite storing of storm water can be either dry or wet. In a Montgomery County shopping center, an old farm pond was modified to serve as a temporary storm-water storage pond. Water enters the pond through a 66-inch pipe, but it only can leave through an 18-inch pipe. The result is a downstream flow of greater duration but of less cubic feet per second. In Montgomery Village, a residential development planned to provide housing for 15,000 people, 13 storm-water management ponds are being constructed. All 13 are wet ponds that can double as sediment basins during construction.

In the opinion of Mark Boysen, an SCS engineering specialist and a member of the team that drew up Maryland's storm-water management design criteria, "Leaching pits are questionable; underground tanks are expensive. Ponds and rooftop storage are probably best. They are inexpensive and relatively maintenance-free."

The program in Montgomery County is still developing, and it's something of a novelty in Maryland. According to Boysen, "Onsite storm-water management is pretty well restricted to Montgomery County."

But storm-water management isn't a sudden development; rather, Boysen explained, "This program has been developing for several years. In Montgomery County there have been statements of policy relating to it for some time."

A resolution, dated February 6, 1970, by the Board of Supervisors of the Montgomery Soil Conservation District declares a policy of "encouraging and assisting in the planned management of water resources, including storm drainage, on a watershed basis." A Montgomery County Council resolution of April 1970 also speaks of "improved storm drainage management on a watershed basis."

"Right now we have only the authority to view drainage on a site-by-site basis," said Williams. "It would be sounder to take a

"When this area (left) was woods, less than an inch of water would run off after a storm of 3 inches; now nearly 3 inches runs off." And it runs into this stream (below). Increased storm flows have been undercutting the steambanks, uprooting trees, and sending tons of sediment downstream.

systems approach and consider the entire watershed as an integrated whole."

The storm-water management program, together with the rest of the Maryland sediment control program, has meant large expenditures of time and effort by officials of the Montgomery Soil Conservation District and the SCS field office that provides technical assistance. The district approves about 350 development plans a year; almost 11 hours are needed to check each plan. If the district gets backlogged, developers can't start construction, and delays can cost a major developer hundreds or thousands of dollars.

The work load of the district is heavy, but a successful program makes it all worthwhile. "I look upon this as a major and basic erosion-control program," said Lew Williams. "We're trying to help the county and the developers to mitigate the undesirable effects of urbanization on stream channels. Our objective is to preserve our streams in as near their natural state as possible." ♦

On the strip mining front: achievement in the trenches

by James Thorn
Information specialist, SCS
Morgantown, West Virginia

Dick White is a strip miner. Jim Clevenger is a conservationist.

In November 1970, they met on a farm in central West Virginia, near Weston, to work together to solve a problem. By spring, they had designed and built two large sediment-collecting ponds below one of White's strip mines to prevent soil from leaving the immediate vicinity of the mining operation.

The ponds are keeping most of the silt coming from the strip mine from entering a Public Law 566 flood-prevention lake on the same property.

The ponds actually are a result of cooperative efforts between the property owner, the mine operator, a soil conservation district, the West Virginia Department of Natural Resources, and the Soil Conservation Service.

The property owner, Simeon Hall, Jr., who is a farmer and farm-equipment dealer in the little community of Camden, sold the coal on his 335 acres to the R. N. White Contracting Co. of Clarksburg. Dick White is president of that company.

Hall explained, "I insisted in the contract that they had to build sediment basins to protect that dam."

There had been sediment problems before on the Hall property. The same coal seams had been strip mined from 1959 to 1962, before the watershed dam was built. A small farm pond filled up with sediment. Hall said of the new sediment ponds, "That's the reason I knew they would do some good."

Hall is on the board of the West Fork Soil Conservation District. He suggested that White ask the Soil Conservation Service for design criteria for the ponds. After a series of discussions between Jim Clevenger, the SCS assistant state conservation engineer in West Virginia, and White, construction of the sediment ponds began.

The SCS soil conservation technician at Weston, Paul Alkire, stayed on the scene while White's workmen built the dams. Also present and helping was Dan McFee, the Department of Natural Resources surface-mine inspector at Weston.

White was impressed with the engineering. "The safety factor on the dams is more than adequate," he said.

One dam, 12 feet high, is for a ¾-acre pond. The other, 16 feet high, is for a 1¼-acre pond. When sediment-bearing water stops behind the dams, the sediment settles to the bottom. The water flows from the top through metal pipes.

The ponds may make ripples statewide. The Soil Conservation Service has been checking on the loss of soil at the mine and the amount of sediment in the ponds for guidelines on the effectiveness of such ponds in surface mining.

White minimized erosion by prompt backfilling and seeding. He seeded grasses and legumes on the benches because Hall wanted to return the land to agricultural production.

The mine operator has limed, fertilized, and seeded according to SCS recommendations. The SCS district conservationist at Weston

The pipe (left) is being installed to allow water to flow out of a sediment-catching pond. The sediment settles at the bottom of the pond. (Below) The two sediment ponds (the light areas in the center) were built to keep sediment washing down from the strip mining areas in the background from entering the flood-prevention dam.

said the area was probably best suited to sericea lespedeza, tall fescue, ryegrass, and sweetclover, which could be harvested for hay after 2 years of growth.

For the outer slopes, grasses and fast-growing black locust were recommended.

The ponds on the White property were the first in West Virginia built to Soil Conservation Service specifications. Since then, soil conservation districts in West Virginia have entered into a memorandum of understanding with the state's Department of Natural Resources offering this type of assistance to mine operators. SCS, through the conservation districts, provided technical assistance for the construction of 50 sediment ponds throughout the state in 1972.

Strip miners and conservationists literally have worked together in the trenches to build the ponds. A lot of pride—in mining coal, in conserving basic resources—has had to be accommodated. And conservationists and strip miners have learned more about the problems involved. ♦

In a 7-year period (1965-1971) approximately 10,000 landowners and mine operators in conservation districts in the United States reclaimed 338,000 acres of surface-mined land. This work has significantly reduced soil erosion, sedimentation, and acid pollution of streams from the mine sites.

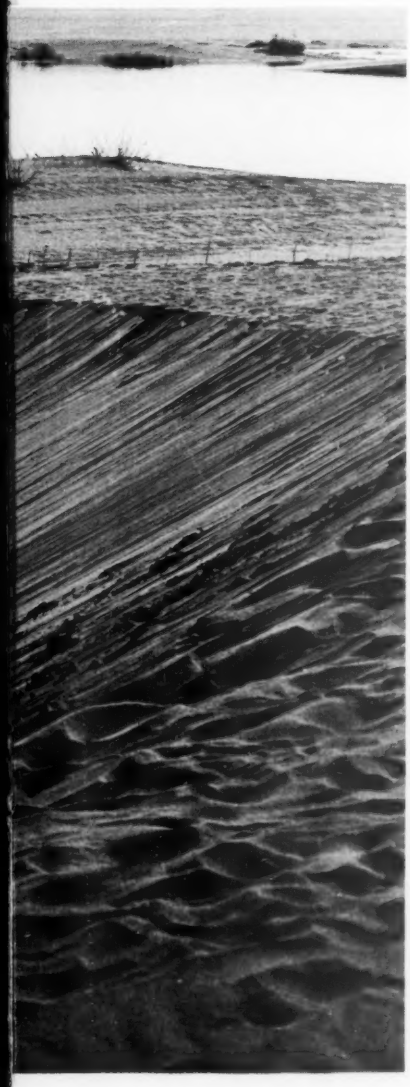
Much more work needs to be done. The latest figures indicate that more than 4 million acres have been disturbed to date in surface mining to harvest coal, sand and gravel, and about 40 other commodities.

About 90 percent of this land is privately owned and is intermingled with farm, ranch, forest, and other land in rural and suburban areas—on which SCS already is giving conservation help.

BOY POWER

in conservation

by Laurence A. Arpin
District conservationist, SCS
Moses Lake, Washington



This island is typical of the several hundred small islands in the Potholes Reservoir that were gradually vanishing into the water because of wind and water erosion. Since 1968, the Boy Scouts of America, by planting grass, trees, and shrubs, have been helping to save the islands.

In the late 1940's, the U.S. Bureau of Reclamation turned a bleak sand dune area in the heart of Washington's Columbia Basin into a paradise.

In more recent years, "boy power"—and some "girl power"—has been saving this paradise and transforming the diminishing islands in the inundated area into protected bits of wildlife sanctuary and recreational playground.

The Bureau of Reclamation constructed a 3½-mile-long dam there in the 1940's. The structure, called the O'Sullivan Dam, was built primarily to store water for irrigation downstream. The 37,000-acre reservoir is called the Potholes Reservoir. Not all of the reservoir area is covered by water. Several hundred small islands, ranging in size from a few square feet to several acres, dot the water. These small islands, generally bare of protective vegetation, were virtually disappearing. Wind erosion and wave action were wearing them down and moving the sand out into the deeper water.

Realizing the fate of the many islands, representatives of the Washington Game Department, Boy Scouts of America, Bureau of Reclamation, and Soil Conservation Service got their heads together and came up with a possible solution. Their plan was to use the several hundred Boy Scouts and Girl Scouts in the Columbia Basin District who had been looking for conservation projects to work on.

Saving the Potholes islands turned out to be more than a conservation project. It was a challenge offering the youths an opportunity to direct their energies to public service that would help wildlife and bring about recreational benefits that they and others could enjoy in the years to come.

In 1968, a conservation camporee was held at the Potholes Reservoir; all Boy Scout troops in the Columbia Basin District were invited. With 408 Scouts and 41 adult leaders on the scene, the project began. Boats shuttled boys, men, and materials to scattered islands. Large quantities of selected species of grass seed had been made available by the Soil Conservation Service's Plant Materials Center at Pullman for test on this project. Tree cuttings and seed of special native grasses were collected by the boys. Other

Wally Morris, of the SCS field office in Moses Lake, shows a group of Scouts how to collect seed from old established stands of Volga wildrye for planting on the islands.

materials and equipment such as bales of straw, trucks, and boats were donated by Scout leaders and private citizens.

A second camporee for 365 boys and 31 adult leaders was held in 1969, and another one in 1970 brought 260 boys and 30 adults to the islands.

"Boy power" at the three conservation camporees planted 40,000 clones and 250 pounds of 'Volga' wildrye, 600 pounds of thickspike wheatgrass, 80 pounds of Indian ricegrass, 300 pounds of tall wheatgrass, 15,000 to 16,000 willow cuttings, and 10,000 Lombardy poplar cuttings. The Indian ricegrass and Volga wildrye seed and the clones were collected by the boys from established stands in other areas. The boys also made the poplar and willow cuttings.

In April 1971, Girl Scouts in the Moses Lake area joined the save-the-islands movement and held a 1-day conservation campout. The girls planted 2,000 small tree seedlings and 1,000 clones of Volga wildrye.

Vegetating and preserving these islands have made a great contribution to wildlife, fishing, picnicking, boating, and water sports in the area. Each island is a potential wildlife sanctuary ideal for family outings or ecology study. The Potholes Reservoir has been turned into one of the most attractive spots in the Pacific Northwest. ♦

Rural Louisiana is cleaning up its streams and countryside. More and more towns and parishes are taking giant steps to put garbage underground and sewage and animal waste in pits.

Mayor Edwin Preis of Newellton makes no bones about it: "That sewage lagoon below town is the best thing that's happened around here in years."

H. M. Fowler, a former mayor of Coushatta, feels the same way about Coushatta's sewage lagoon system.

Charles McDaniel, looking out over his dairy herd in Tangipahoa Parish, said, "This animal-waste lagoon system saves me money and, at the same time, keeps waste from polluting streams."

And up in DeSoto Parish, Police Juryman Albert Reeves said, "Cans and garbage look better in a sanitary landfill than along the roadside."

No more septic tanks

Newellton is a Tensas Parish town with a little over 1,400 people. The way Mayor Preis tells it, septic tanks were no longer satisfactory. "The soil was poorly suited for septic tanks to begin with. There were so many in town that the soil could not soak up all of the effluent, and so it came to the surface—especially when it rained. The smell was pretty bad; we had to do something."

The Newellton sewage lagoon system is about 2 miles from

Treat your waste right

by Gene Warren
Public information specialist, SCS
Alexandria, Louisiana

town and covers about 20 acres. The town's sewage flows into the lagoon through pipes, and bacteria breaks down the solids. An almost clear liquid flows from an outlet pipe into a ditch. "Experts say the liquid is pollutant free and does no harm to fish," commented the mayor.

Preis said the Newellton system cost about half a million dollars. "We couldn't have financed the project if the Farmers Home Administration hadn't given us a long-term low interest loan. Also, the Agriculture Stabilization and Conservation Service cost-shared with a little more than $2,200 as part of its Greenspan Program, and the Soil Conservation Service helped with soil and seeding recommendations. All in all, we had lots of help, and the town is grateful."

Sewage lagoons need to be built right and located in the proper place. The Louisiana

The population growth expected within the next 10 to 15 years was a factor considered in designing this 30-acre sewage lagoon for Rayville, Louisiana, whose present population is a bit under 5,000. Billy McGlothlin, superintendent of Rayville's water department, is on the left, and Hugh Tidwell, SCS district conservationist, is on the right.

"It's perfectly clear." Lon Cloniger, on the right, a past mayor of Rayville, and Tidwell inspect the discharge point of the sewage lagoon.

State Board of Health has drawn up specifications for sewage lagoons as well as for animal-waste lagoons. Private engineering firms usually design and supervise construction of sewage lagoons. The Soil Conservation Service provides technical help in building animal-waste systems and is called on for soil maps and interpretations to help locate sites for both types of systems. Coushatta is a good example of this.

The system there was completed in 1970. But before it was started the mayor called on the local SCS office for information about soils. Soils of clay or clay loam texture are best for sewage lagoons because they hold water. Soil surveys were used to locate these soils.

"Before we put in our system our sewage was going into the Red River," said Fowler, who was mayor at the time. "Now it's trapped in the lagoon. On top of that, this system cost us about one-tenth of what a treatment plant costs."

Low maintenance cost is a big factor in sewage lagoons. Raymond Granelle, with the health unit at Rayville, said that the 30-acre lagoon serving that town needs just an occasional check on the water level, and the grass on the levees has to be mowed. Rayville's system, like most others, is designed to take care of the population growth within the next 10 to 15 years.

The rivers run clean

Tons of animal waste that once flowed into Louisiana's streams and lakes each day are now going into sewage lagoons. More than 150 animal-waste systems have been built in the state by dairymen.

Charles McDaniel of Wilmer was one of the first to complete his lagoons. He said that before he built his waste system all the manure was shoveled and loaded at the barn and hauled to pastures. "Lots of it washed into streams and so did most of the waste that washed out of the barns. Now, it goes right into the lagoons," said McDaniel, a longtime cooperator with the Bogue Chitto-Pearl River Soil and Water Conservation District. He asked for help from SCS in finding a suitable site for his lagoons and in designing their layout.

Underground garbage disposal

Many people don't have places to dump trash, so they put it on the road or on somebody's land. Many police juries are doing something about this problem. DeSoto Parish residents, for example, have access to seven sanitary landfills. Police Juryman Albert Reeves said the big advantage of landfills is that when full they can be covered and the land can be put to another use.

SCS is helping parishes throughout the state to locate suitable sites for landfills. Good drainage is important. One end of the trench has to be open so water can drain out. The soil has to be right so banks won't slough.

In Louisiana it's perfectly clear that rural people want to do their bit to clean up the countryside and to keep animal and human wastes out of their lakes and streams. Now that's a good sign. ♦

Animal waste from this dairy barn is washed into a drainageway that carries it into the lagoon system in the background.

Help yourself

by Richard L. Thompson
RC&D project coordinator, SCS
Kemmerer, Wyoming

There was a time in Kemmerer, Wyoming, when the drinking water took on a "different" taste right after a storm. And esthetically the town wasn't any better off. People approaching Kemmerer from one end of town were greeted by an open garbage dump, and from the other end by a rundown cemetery.

Then, in 1968, things began to happen. People in Lincoln and Uinta Counties organized the Western Wyoming Resource Conservation and Development Project to help in the development of urban and agricultural areas in the two counties.

RC&D projects are locally initiated and directed, permitting local people to work together for mutual goals. The Soil Conservation Service has U.S. Department of Agriculture leadership in providing assistance to sponsors of RC&D projects.

Soon after the Western Wyoming RC&D Project was organized, Kemmerer officials asked the project's executive committee for help in developing a sanitary landfill and in improving the town's cemetery. The committee approved the request.

Today the town's cemetery is no longer an eyesore, and a landfill has replaced the old dump, which has been covered with soil and allowed to go back to native vegetation.

With the support of the RC&D committee, Kemmerer obtained a grant from the Department of Housing and Urban Development for the design and installation of a new water supply system.

The people of Kemmerer know that RC&D projects promote the concept of "self-help," and that's what they have done. ♦

Kemmerer, Wyoming, has a sanitary landfill . . .

a new water treatment plant . . .

and a sprinkler system for its cemetery—all because of an RC&D project.

Review

Audiovisuals

The Effects of Air Pollution on Plant Life. *1972. USDA, Office of Communication, Photography Division. Slide set A-48.* $18.50. This new slide series illustrates damage done to vegetables and fruits, field crops, and ornamental plants and trees by pollutants in the air. Some slides compare plants grown in filtered air to those grown in normal air. Others show closeups of leaves and fruit suffering oxidant or other injury. The set of 105 slides is broken into three subsets which can be purchased individually for $13. The subsets are: A-48-A, "Vegetables and Fruits," A-48-B, "Field Crops," and A-48-C, "Ornamental Plants and Trees." A narrative guide accompanies each set or subset.

New publications

Erosion and Sediment Control Handbook. *1971. Cumberland, Dauphin, and Perry Soil and Water Conservation Districts (Pennsylvania) in cooperation with the Soil Conservation Service. 75 pp., illus.* The primary purpose of this handbook is to help municipal officials develop and administer erosion and sediment control programs in urbanizing areas. It explains tried and proved ways to control erosion and reduce sediment. Specifically it gives guidelines, standards and specifications, definitions, and sample materials for use by planning commissions, township supervisors, borough officials, developers, contractors, and others. Some of the practices recommended in the report are grass and legume covers, sodding, mulching, and drainage, and constructing grassed waterways, grade stabilization structures, temporary and permanent diversions, and debris basins. The appendix includes models for resolutions amending land subdivision regulations and for ordinances for erosion and sediment control.

Rural Development, Part 1. *Information and Technical Assistance Delivered by the Department of Agriculture in Fiscal Year 1972. 71 pp.* In this third annual report to the Congress, USDA states that its employees and those of the State Cooperative Extension Service devoted 34 percent more time to rural development activities in Fy '72 than in Fy '71 and helped local leaders organize more than 150 new rural development committees. Some 51 new area or multicounty rural development committees were formed, bringing the number of area committees in the nation to 235, and more than 100 new county committees were formed, pushing the national total to 2,193.

Rural Development, Part 2. *Financial and Technical Assistance Provided by the Departments of Agriculture and Housing and Urban Development for Nonmetropolitan Planning Districts in Fiscal Year 1972. [82] pp.* HUD, in Fy '72, doubled state funding for comprehensive planning, and USDA and cooperating state agencies increased technical assistance for nonmetropolitan planning districts, developed closer relationships with state agencies responsible for planning administration, and put more emphasis in their own programs on development priorities set by multicounty agencies in some areas.

Asphalt Linings for Seepage Control: Evaluation of Effectiveness and Durability of Three Types of Linings. By C. W. Lauritzen and A. R. Dedrick. *1972. USDA Tech. Bull. 1440. 61 pp., illus.* $0.35. In 1945 an outdoor seepage laboratory was constructed on Logan River, Logan, Utah, to obtain more accurate information on the performance of canal and reservoir linings. Included were four seepage channels, each divided into eight 20-foot-long sections. Fourteen of these 32 available test sections were used for the asphalt lining studies. This bulletin summarizes the test findings of the studies.

Geological Survey Research 1972, Chapter B. *1972. U.S. Department of the Interior, Geological Survey Professional Paper 800-B. 281 pp., illus.* $2.25. Chapter B is a collection of 39 short papers reporting on scientific and economic results of current work by the U.S. Geological Survey on analytical methods, astrogeology, economic geology, geochemistry, geophysics, glacial geology, ground water, hydrologic techniques, isotope hydrology, marine geology, paleontology and stratigraphy, petrology and mineralogy, remote sensing, structural geology, surface water, and urban hydrology. Chapter A will be published later.

Growing Ornamental Plants in Containers: A Handbook for the Nurseryman. John J. McGuire. *1972. Univ. of Rhode Island, Cooperative Extension Service (Kingston) Bull. 197. 39 pp., illus.* This handbook gives a thorough treatment to the subject, discussing everything from container types to packaging and marketing. The information is based on research conducted in the past 10 years and applies specifically to the Northeast. The principles of growing container plants, however, are universally applicable. The plants grown in containers in various phases of the research are listed in the appendix.

Seed Crops, Revised Estimates, 1964-69. *1972. USDA Statistical Bull. 499. 29 pp.* Presents the revised estimates of acres harvested, yield per acre, production, season average price received by growers, and value of production, by states, for 17 kinds, varieties, and species of seed crops. Also included are U.S. totals of carryover, imports, total supply, total disappearance, and exports for seeds estimated.

A History of Federal Water Resources Programs, 1800-1960. By Beatrice Hort Holmes. *1972. USDA Misc. Pub. 1233. 51 pp., illus.* Discusses most of the significant federal water resources legislation up to 1960 and describes the programs of U.S. planning and construction agencies; the extent of federal river basin planning and development up to 1960; and the beginning of federal encouragement of and cooperation with state and local planning.

Facts About Resource Conservation and Development Projects. *1972. USDA SCS-CI-14. [4] pp.* Explains the purpose and outlines the procedure for starting a resource conservation and development project.

Soil survey

Woodbury County, Iowa. By John R. Worster, Elmer H. Harvey, and Laurence T. Hanson. *1972. Soil Conservation Service in cooperation with Iowa Agriculture and Home Economics Experiment Station. 87 pp., illus.; maps 4 inches to the mile (1:15,840).*

Pope County, Minnesota. By Raymond T. Diedrick. *1972. Soil Conservation Service in cooperation with University of Minnesota Agricultural Experiment Station. 109 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Pinellas County, Florida. By Earl S. Vanatta, Jr., Leon T. Stem, William H. Wittstruck, David E. Pettry, and James W. Spieth. *1972. Soil Conservation Service in cooperation with University of Florida Agricultural Experiment Stations. 64 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Montgomery County, Texas. By W. R. McClintock, Jr., T. L. Galloway, B. R. Stringer, and L. E. Andrew. *1972. Soil Conservation Service and Forest Service in cooperation with Texas Agricultural Experiment Station. 70 pp., illus.; maps 3.17 inches to the mile (1:20,000).*

Meetings

February
- 18–21 Sprinkler Irrigation, Technical Conference, Dallas, Tex.
- 20–22 National Agricultural Outlook Conference, Washington, D.C.
- 20–23 Southern Forest Institute, Atlanta, Ga.
- 21–23 Family Camping Federation, Nettles Island, Stuart, Fla.
- 24–28 American Association of School Administrators, Atlantic City, N.J.
- 25–28 National Association of Regional Councils, Minneapolis, Minn.
- 28–Mar. 2 Land Improvement Contractors of America, New Orleans, La.

March
- 2–4 International Geobotanical Conference, Knoxville, Tenn.
- 3–6 Hardwood Plywood Manufacturers Association, Disneyworld, Orlando, Fla.
- 3–6 American Camping Association, Philadelphia, Pa.
- 9–15 Associated General Contractors of America, San Francisco, Calif.
- 11–14 Farmers Union, Omaha, Nebr.
- 11–16 American Society of Photogrammetry, Washington, D.C.
- 11–17 National Wildlife Week.
- 16–18 National Wildlife Federation, Washington, D.C.
- 17–28 American Association of School Administrators, San Francisco, Calif.
- 18–21 The Wildlife Society, Washington, D.C.
- 18–21 North American Wildlife and National Resource Conference, Washington, D.C.
- 18–21 Association for Supervision and Curriculum Development, Minneapolis, Minn.
- 25–27 National Recreation and Parks Association, Southern Region, Memphis, Tenn.
- 28–30 National Conservation Tillage Conference, Soil Conservation Society of America, American Society of Agronomy, American Society of Agricultural Engineers, and National Association of Conservation Districts, Des Moines, Iowa
- 30–Apr. 3 National Science Teachers Association, Detroit, Mich.

April
- 1–5 American Concrete Pipe Association, Washington, D.C.
- 1–5 American Road Builders Association, Houston, Tex.
- 2–6 American Pulpwood Association, Atlanta, Ga.
- 4–6 Water Resources Congress, Washington, D.C.
- 7–12 National Planning Conference, Los Angeles, Calif.
- 8–13 Association for Educational Communication and Technology, Las Vegas, Nev.
- 9–11 National Water Safety Congress, Tulsa, Okla.
- 9–15 Earth Week.
- 15–18 Association of American Geographers, Atlanta, Ga.
- 16–20 American Geophysical Union, Washington, D.C.
- 16–20 Western Snow Conference, Grand Junction, Colo.
- 23–25 National Academy of Sciences, Washington, D.C.

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Recon . . .

Wild duck chase. Wisconsin has not always been one of the leading wild-game states in the nation. The September 7, 1905, edition of *The Iola Herald* reported: "Two hundred and fifty hunting licenses were issued by county clerk Shoemaker before September 1, the opening day of the hunting season. What the hunters around here want to shoot is a mystery to us. You may go out into the woods, tramp around all day, and if you see more than a lone red squirrel or a blue jay, you are lucky. It is said that if there is one wild duck in the neighborhood, and as soon as it can be located, a regiment of hunters will be sent after it. Hunting for game in this country is a thing of the past."

Figures for 1972 were not available at presstime, but in 1971, Wisconsin issued 805,824 hunting licenses (including resident, nonresident, archer, junior archer, small game, and large game).—Ed.

Humanizing the earth. "Just as nature has not been capable by itself of giving full expression to its potential diversity, likewise it is not capable of maintaining manmade environments in a healthy state. Now that so much of the world has been humanized, environmental health depends to a very large extent on human care. Swampy areas must continually be drained, forests must be managed, the productivity of farmlands must be maintained by crop rotation, irrigation, fertilization, and destruction of weeds. . . . Man can create artificial environments from the wilderness and manage them in such a manner that they long remain ecologically stable, economically profitable, esthetically rewarding, and suited to his physical and mental health . . ."—Rene Jules Dubos, professor emeritus, Rockefeller University, New York City, speaking to the American Association for the Advancement of Science in December 1972.

What a whey to go! Although curds and whey may have been a delight to Little Miss Muffet, most of us have never seen these byproducts of cheese-making, much less eaten them. That situation soon may change, according to Dr. Joseph F. Mattick, professor of dairy science at the University of Maryland in College Park. For several years, dairy scientists at the university have been engaged in research on utilizing fluid acid whey, the byproduct of cottage cheese processing. So far, they have been able to successfully produce jams, jellies, sweetened fruit-flavored drinks, cocktail mixers, ice cream, and sherbets using whey as a base. Work is currently in progress on perfecting a whey wine.

And where does it go? One acre of cultivated land averages 12 tons of erosion every year, and 1 acre of land exposed during construction can average 250 tons of erosion every year, according to the Agricultural Experiment Station, The Pennsylvania State University.

City life continues to lose its appeal for many Americans. Only 13 percent of persons interviewed in a recent survey (Gallup Poll) said they would prefer to live in a city rather than a nonurban area; 23 percent picked a farm as the ideal place to live, and 32 percent picked a small town. This contrasts with a 1966 Gallup Poll in which 22 percent of respondents stated a preference for city life. These changing attitudes are of significance to city planners, urban developers, and others who must make long-range decisions based on projected population movement.